REMARKS/ARGUMENTS

The specification has been amended to update the status of several cited copending applications. No new matter is presented with these amendments.

Claims 1 and 22 have been amended to include the subject matter of cancelled Claim 8 and to indicate that the barrier layer is coated predominantly from one or more polar organic solvents as described on page 50 (lines 27-31). They have also been amended to incorporate the lower limit of the scavenger as described in original Claim 23.

Claims 5 and 6 have been amended to be consistent with amended Claim 1.

The allowance of Claims 23-25, and the allowability of Claim 9 (if rewritten in independent form) are very much appreciated. However, it is believed that the noted amendments provide reasonable basis for the allowance of all remaining claims.

Rejections Under 35 U.S.C. §102(b)

I. Claims 1-8, 11-22, 26, 28, and 29 have been rejected as anticipated by U.S. Patent 3,708,304 (Hiller).

II. Claims 1, 2, 4-6, 10-20, 26, and 29 have been rejected as anticipated by U.S. Patent 4,880,723 (Harai et al.).

As far as they apply to claims presently in this application, each of these rejections is respectfully traversed.

Rejection I:

The rejected claims now call for the presence of from about 0.4 to about 1 mole of scavenger in the barrier layer per mole of silver carboxylate. This feature provides novelty over Hiller because Hiller describes an upper limit for its divalent metal salt image amplifiers of 0.20 mole per mole of silver salt oxidizing agent (Col. 2, lines 36-39). Applicants' claims call for at least twice as much scavenger. Thus, all remaining claims are novel over Hiller and the Section 102(b) rejection should be withdrawn.

Rejection II:

The rejected claims now call for the presence of a hydrophobic binder in the barrier layer that is coated out of predominantly polar organic solvents. Hirai et al. is clearly directed to "aqueous-based" imaging materials in which the binders used for all layers are "hydrophilic" or water-dispersible in the case of the polymer latexes (Col. 13, lines 53-65). While minor amounts of organic solvents can be used to disperse hydrophobic compounds (Col. 14, lines 3-8), such solvents are present in very low amounts and are not intended to be the predominant coating solvents. Rather, the layers are coated out of water as the predominant solvent (e.g. Cols.18, lines 30 and 53; 19, line 28; and 24, lines 51-53). Water is also used predominantly to facilitate development and/or dye diffusion and transfer (Cols. 3, lines 12-20; 4, lines 29-36; 16, lines 57-68; and 17, lines 1-40). Thus, Applicants' claimed invention is not described in Harai et al. and the Section 102(b) rejection should be withdrawn.

Rejections Under 35 U.S.C. §103

III. Claims 1-8, 11-22, 26, 28, and 29 have also been rejected as unpatentable over Hiller.

IV. Claim 27 has been rejected as unpatentable over the combination of Hiller with U.S. Patent 5,422,234 (Bauer et al.).

V. Claims 1, 2, 4-6, 10-20, 26, and 29 have also been rejected as unpatentable over Harai et al.

As far as they apply to claims presently in this application, each of these rejections is respectfully traversed for reasons presented below. Each rejection is addressed in turn after a brief description of the present invention and the problem it has solved.

Applicants' Invention:

Thermographic and photothermographic materials, such as the materials of Applicants' invention, generally include a source of reducible silver ions for thermal development. The most common sources of reducible silver ions are silver fatty acid carboxylates. Other components in such materials include a reducing agent system that usually includes a reducing agent, and optionally a toning agent (common ones being phthalazine and derivatives thereof).

Applicants found that by-products including various fatty carboxylic acids (such as behenic acid) are formed in thermographic and photothermographic materials during thermal development. These fatty acid by-products as well as the reducing agent and any toner that is present can readily diffuse out of the materials during thermal development and cause debris build-up on the thermal processing equipment (such as processor drums or thermal print-heads). This may result in the processed materials sticking to the processing equipment and causing a jam in the machine, as well as scratching of the outer surface of the developed materials. Additionally, cleaning of the machine to remove this debris can result in machine downtime, and increase the number of service calls.

While there are a number of known "barrier" layer materials for thermally developable materials, Applicants found that there remains a need for additional suitable barrier layer materials that provide physical protection while inhibiting the diffusion of various chemicals during thermal development.

Applicants found that this problem was solved by using a particular barrier layer containing certain metal hydroxides and carboxylates dispersed in hydrophobic binders. These "scavengers" are present in an amount of from about 0.4 to about 1 mole per mole of silver carboxylate. The barrier layer formulation is coated out of predominantly polar organic solvents, making it more compatible with the hydrophobic components and the other hydrophobic layers in the materials. The resulting formulations provide excellent chemical and/or physical barriers to the fatty carboxylic acids and other mobile chemicals, such as phenolic developers and toners.

Rejection III:

Hiller is cited as disclosing thermographic and photothermographic elements containing organic silver salts and zinc acetate that can be incorporated into various layers including protective layers. The Office Action contends that it would be obvious to one skilled in the art to use the metal acetate of Hiller in the anti-abrasion outcoats at the concentrations disclosed therein.

Applicants believe that the rejection of the presently claimed invention as unpatentable over Hiller is incorrect and should be withdrawn for the following reasons. Applicants' claimed invention is directed to a different

problem than that of Hiller and thus requires different amounts and locations for the metal scavenger.

As pointed out above, Applicants' claimed invention is directed to solving a problem caused by diffusing by-products of thermal development. The by-products are "scavenged" by the metal compound located in a barrier layer that is located farther from the support than the imaging layers. Thus, the metal scavenger cannot be incorporated into the thermal imaging layers because it would interfere with the imaging reactions.

Hiller, in contrast, teaches the use of metal compounds such as zinc acetate as a "catalyst" or "amplifier" for the image-forming oxidation-reduction reaction. Thus, it must be used in or near the imaging chemistry so it is effective for its intended purpose. While the zinc acetate might be used in an anti-abrasion overcoat (Col. 15, lines 5-10), the predominant location for zinc acetate is in the layers containing imaging chemistry. If it is included in a "barrier" layer remote from the imaging layer, it would be ineffective for its intended purpose.

In addition, the amplifier in Hiller is used in an amount of up to 0.20 mole per mole of silver salt oxidizing agent, and even lower amounts are preferred. This is considerably less than the 0.40 mole per mole of silver salt called for in Applicants' claimed invention. This higher amount is needed because of the scavenging purpose that it is intended to have. In other words, more is needed to effectively scavenge mobile reaction by-products resulting from the imaging chemistry.

While Hiller clearly suggests heat-developable materials containing zinc acetate and other metal salts, it fails to direct a skilled artisan to use higher amounts of such compounds in different layers to solve a very different problem. Thus, Applicants' claimed invention is not rendered obvious by the teaching in Hiller and the rejection over Hiller should be withdrawn.

Rejection IV:

Claim 27 is said to be unpatentable because Bauer et al. is alleged to teach the use of photothermographic materials as photomasks, and thus it would be obvious to use the material of Hiller for that purpose.

Applicants don't deny the alleged teaching in Bauer et al. but they submit that Claim 27 is patentable for the same reasons noted above in rebuttal of

Rejection III. Since Bauer et al. fails to overcome the deficiencies of Hiller and Claim 27 depends eventually from Claim 1, its patentability is likewise evident despite Hiller and Bauer et al.

Rejection V:

The Office Action contends that Applicants' claimed invention is unpatentable over Hirai et al. because it discloses their elements containing zinc hydroxide or managanese hydroxide as well as water-soluble zinc acetate. It is also alleged that these compounds can also be used in protective layers over imaging layers containing silver salts and silver halide (e.g. Example 1). The Office Action then alleges that it would be obvious to use the various amounts of metal compounds that would inherently scavenge reaction by-products.

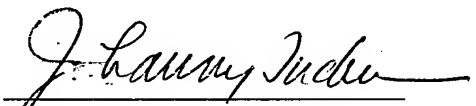
Applicants respectfully disagree with this analysis. The problem solved by Applicants' claimed invention is very different than that described in Harai et al. While Applicants' claimed invention solves a problem that arises during or after development (reaction by-products), Harai et al. is directed to improving shelf stability before development and development speed (Col. 2, lines 44-48). Harai et al. uses a combination of a water-insoluble basic metal compound and water-soluble metal of the ionic metal of which the basic metal compound is made. This combination of compounds is required to stablize imaging chemistry before development, and has nothing to do with scavenging by-products after development. The statement in the Office Action that the combination of compounds would "inherently scavenge reaction by-products" is speculative because nothing in Harai et al. would give that impression or suggest such a conclusion. If the Examiner has scientific evidence to support his opinion, it should be made of record for Applicants' consideration.

The combination of compounds taught in Harai et al. is designed to be used in aqueous-based materials that are coated out of aqueous solutions (see the Examples and Col. 4, lines 29-35), developed in the presence of water (Col. 16, lines 57ff), and image-formation by dye diffusion in the presence of water (Col. 17, lines 3ff). This is very different from Applicants' claimed invention that requires a barrier layer coated out of polar organic solvents and containing hydrophobic binders that would be soluble in such coating solvents. Applicants' claimed invention has nothing to do with aqueous coating, development, or dye

image transfer. Thus, Applicants' claimed materials are "organic-solvent based" materials and processed under dry thermal conditions whereas the materials of Hirai et al. are clearly aqueous-based materials that have different imaging and development needs. Thus, the presently claimed invention would not be suggested by the teaching in Hirai et al. and this rejection should be withdrawn.

In view of the foregoing amendments and remarks, reconsideration of this patent application is respectfully requested. A prompt and favorable action by the examiner is earnestly solicited.

Respectfully submitted,



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